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IMPACT OF TOTAL ARTERIAL COMPLIANCE, ASCENDING AND DESCENDING AORTIC WALL STIFFNESS ON LEFT VENTRICULAR MASS AND GEOMETRY

Poster Contributions
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Impact of Total Arterial Compliance, Ascending and Descending Aortic Wall Stiffness on Left Ventricular Mass and Geometry

Background: The compliance of the arterial tree and aortic wall stiffness influence the pulsatile load of the left ventricle (LV). Limited data are available regarding the relationships between the stiffness of various aortic segments, total arterial compliance (TAC), and LV remodeling.

Methods: We prospectively studied 250 subjects (238 males) without heart failure or significant valve disease. All subjects underwent a cardiac MRI. We assessed: (1) Ascending aortic pulse wave velocity (PWV); (2) Carotid-to-femoral PWV using applanation tonometry; (3) TAC (stroke volume/pulse pressure). We assessed the relationship between these arterial properties and: (1) LV mass, measured with steady-state free precession imaging; (2) LV remodeling, expressed as LV mass/volume. Regression models were constructed using backward stepwise elimination. Additional variables were forced into the models based on biologic relevance.

Results: In multivariable models, ascending aortic PWV, but not carotid-femoral PWV, was associated with LV mass. TAC was associated with concentric remodeling (Table).

	LV Mass*	LV Mass/Volume Ratio**
	Standardized β-Coefficient (p-value)	Standardized β-Coefficient (p-value)
Total Arterial Compliance	0.16 (0.07)	-0.33 (0.001)
Ascending Aorta PWV	0.51 (0.01)	-0.002 (0.99)
Carotid-to-Femoral PWV	0.08 (0.44)	0.02 (0.87)
* Adjusted for age, central mean pressure, BMI, hypertension, use of antihypertensives, smoking status, obstructive sleep apnea.		
** Adjusted for age, central mean pressure, antihypertensive use, and obstructive sleep apnea.		

Conclusions: Ascending aortic stiffness, but not carotid-femoral PWV, is independently associated with LV hypertrophy. In contrast, TAC is associated with concentric remodeling. Our findings highlight the differential relationships between arterial characteristics and LV remodeling.